

## PSYCHE.

### NOTES ON THE ACRIDIDAE OF NEW ENGLAND.—II. TRYXALINAE.—I.

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This subfamily is nearly related to the Oedipodinae, the division between them being somewhat arbitrary and depending upon personal opinion. In New England there are two distinct groups, one of typical Tryxalinae, the other consisting of a genus, *Mecostethus*, closely approaching the Oedipodinae, as shown especially in the structure of the tegmina and stridulating apparatus, but also in the form of the vertex and pronotum.

With a single exception, in every member of the subfamily here treated the male is provided with a stridulating apparatus for producing sounds serving to attract the other sex. These sounds are produced while the insect is at rest by rubbing the hind femora against the tegmina, the sound being due to the vibration of the tegmina caused by the friction of a row of fine teeth against an opposing surface. The teeth are usually borne on the internal ridge of the femur, but in *Mecostethus* the intercalary vein of the tegmen, and sometimes its adjoining venules, bears the rasping surface, the ridge of the femur being smooth. In this connection it should be said that several Oedipodinae have this vein more or less roughened

or even distinctly toothed, especially *Encoptolophus sordidus*, and stridulate at rest as well as during flight, as I have observed the above-mentioned species and *Circotettix verruculatus* to do. This sound-producing apparatus varies specifically, and each kind of locust doubtless has its distinctive note which is appreciated by particular ears. The notes are also varied in some degree at the will of the performer. Surrounded by them on every side, for some are among the commonest of insects, how few there are who ever give a second thought to these little serenaders in the grass! Here is a wide and extremely interesting field awaiting observers which has hitherto been cultivated almost alone by Mr. Scudder, who has published a noteworthy paper upon the subject in the 23rd Report of the Entomological Society of Ontario, references to which will be found under several of our species.

Of this subfamily ten species are known to occur in New England, and I have treated here two additional ones which have been taken by Beutenmüller on Long Island in the near vicinity of New York and which will probably be found in Conn. Of the ten two were

described by Harris in his Report, and seven by Scudder in his Materials. So variable are some of these species in color and structure that it is not surprising that several additional names were applied to forms which further study has shown to be one species.

Some doubt still remains as to the proper specific names to be borne by certain species, but since nothing less than a study of the fauna of the localities from which the types were procured and a comparison when possible with the types will finally settle the specific terminology, such a course involving an amount of research impracticable at present, I have retained the current names.

It was to be expected, as it has proved, that changes would be required in the generic appellations hitherto borne by several of our species. Thanks to the masterly Revision of Brunner von Wattenwyl (Rév. d. syst. d. orth., — Ann. d. Mus. civ. d. Genova, ser. 2a, vol. xiii, 1893) the American student of orthoptera can now align his work more closely in this respect with that of European contemporaries. Nevertheless, in applying to the American fauna the generic diagnoses therein set forth much caution is necessary, owing partly to the extreme brevity of characterization, and partly because forms will be met with either unknown to that author, unknown to occur in this hemisphere, or for some reason not included. The substitutions are: *Orphula*, for three species usually spoken of as *Stenobothrus*; and *Mecostethus*, for those hitherto called *Arcyptera* or

*Stethophyma*. In addition, it has seemed necessary to establish new genera for those forms commonly known as *Opomala brachyptera* and *Chlocallis* (or *Chrysochraon*) *viridis*, and one less known species.

In addition to most of the works listed in Part I of these Notes, Comstock's Introduction, Smith's Orth. of Maine and Orth. of Conn. (full titles may be found in my Preliminary List, — Psyche, '94, pp. 102-108), and Beutenmüller's Orth. of New York (Bull. Amer. mus. nat. hist., vi, 253-276, '94) are cited.

The technical terms used will need no explanation to the student of orthoptera and with the aid of the drawings will be readily understood by others. In this connection it may be of interest to state that the author has in contemplation an Introduction to the Acrididae of a more popular character than these Notes can of necessity be.

The following paper is based upon the material in my collection, and the notes thereon, consisting of over 4000 specimens chiefly collected in person, and comprising examples of both sexes and every form, reversional or dimorphic, known to occur in New England. I have also examined Mr. Scudder's collection, which is of especial interest in containing the types of several species.

Since the publication of Part I continued study of the genus *Tettigidea* indicates the specific identity of our two forms and their distinctness from *T. lateralis* and *polymorpha* (see Journ. N. Y. ent. soc., Sept., '95). Consequently our species must receive

Harris' name *parvipennis*, which was applied to the short-winged form, and I have proposed *pennata* to distinguish the long-winged form. The elimination of one species causes the first of the present group to be numbered 6.

In conclusion I desire to express my great obligation to Mr. Scudder for the opportunity so freely afforded for examining his collection and for aid rendered in consulting the literature of the group.

KEY TO SUBFAMILIES AND TRYXALINÆ.

- a. Pronotum covering all or nearly all of the abdomen; pulvilli absent from between the tarsal claws. . . . . TETTIGINÆ.
- aa. Pronotum normal, not covering the abdomen; pulvilli present.
  - b. Prosternum not spined,—flat, convex, or at most with an obtuse tubercle.
    - c. Hind margin of pronotum not or but little produced,—truncate, convex, or very obtusely angulate. Face usually retreating, and angulate at meeting with vertex. . . . . TRYXALINÆ.
    - cc. Hind margin of pronotum strongly produced,—acute, right-angled, or nearly so. Face usually nearly or quite vertical, and rounded at meeting with vertex. . . . . OEDIPODINÆ.
  - bb. Prosternum with a prominent conical or cylindrical spine projecting ventrad to the level of the distal end of coxa. . . . . ACRIDINÆ.

TRYXALINÆ.

- 1. Antennæ distinctly ensiform. (Figs. 6, A.)
  - 2. Prosternum obtusely tuberculate. ♂ with rasp on inside of hind femora, and terminal segment of abdomen twice as long as wide (Fig. 6a); ♀ with ovipositor short, bearing a stout tooth on external margin of each valve (Fig. 6b). Wings and tegmina usually abbreviated. (Gen. 5, *Pseudopomala*, gen. nov.) . . . . . Sp. 6, *Ps. brachyptera*.
  - [2<sup>1</sup>. Prosternum not tuberculate. ♂ without rasp and terminal segment shorter (Fig. Aa); ♀ with ovipositor long, distinctly exerted, and without teeth as above (Fig. Ab). Wings and tegmina fully developed. *Tryxalis brevicornis*.]
- 1<sup>1</sup>. Antennæ linear.
  - 3. Tegmina without well-developed intercalary vein. (Cf. Figs. Sb, 13a.)
  - 4. Foveolæ not visible from above,—often shallow or wanting.
  - 5. Antennæ short, about equal to head plus pronotum. Tegmina with scapular area not dilated. Wings functional (though sometimes quite small), provided with opaque thickening on veins of front margin at apical third (Fig. Se), in ♂ a coarsely and regularly reticulated space behind it.

6. Sides of pronotum elongate, the length on dorsal margin greater than the depth (Fig. 7b). Lateral carinae nearly or quite parallel and disc unicolorous (Figs. 7, B). Foveolae absent.
7. Sides of pronotum nearly vertical, flat above, meeting disc at nearly a right angle; lateral carinae parallel throughout (Figs. 7, 7a). (Gen. 6, *Dichromorpha*, gen. nov.). Sp. 7, *D. viridis*.
- [7<sup>1</sup>. Sides of pronotum convex above; carinae slightly divergent on metazona (Figs. B, Ba). (*Clinocephalus*, gen. nov.)  
*C. elegans* sp. nov.]
- 6<sup>1</sup>. Sides of pronotum not elongate (Fig. 8d). Lateral carinae more or less divergent before and behind, and disc usually parti-colored on metazona (Figs. 8, 9, 10). Foveolae usually present on front margin of vertex (Fig. 8c). . . . (Gen. 7, *Orphula*.)
8. Vertex of head about rectangular, or a little acute in ♂; a little narrowed between eyes; its central depression removed from apex one-third (♂) to one-fourth (♀) the width of the vertex; foveolae distinct, narrowly triangular. Lateral carinae of pronotum strongly incurved, and the distance between them at hind margin much greater than at front margin. Prozona and metazona (Fig. 7) about equal on midline. Tegmina passing hind femora; apex scarcely tapering, sides sub-parallel; ulnar area in ♂ usually closely reticulated (sometimes with spurious vein), but little wider than discoidal area; ♀ with ulnar and discoidal areas of equal width, the anterior ulnar vein parallel to radial and the ulnar area divided by a long spurious vein. Apex of wings usually with well-developed spurious veins between branches of radial vein. (Figs. 8-8e). Sp. 8, *O. maculipennis*.
- 8<sup>1</sup>. Vertex of head blunt, rounded, obtuse (♀), or rectangular (♂); scarcely narrowed between eyes; its central depression close to apex; foveolae shallow, triangular, scarcely discernible. Lateral carinae of pronotum little incurved, the distance between them but little greater at hind than at front margin, especially in ♀. Prozona longer than metazona. Tegmina about reaching end of hind femora, often shorter, sometimes longer, tapering toward apex; ulnar area in ♂ coarsely, often regularly, reticulated, the anterior ulnar vein strongly approximated to the radial; in ♀ usually slightly but distinctly nearer the radial, the widest part of the ulnar area wider than the discoidal area, spurious vein poorly developed or absent. Apex of wings rarely with spurious veins between the branches of radial. (Figs. 9-9c). . . . Sp. 9, *O. aequalis*.

- ♂. Vertex of head acute, the sides often concave in ♂, distinctly narrowed between eyes, the central depression far removed from apex (at least one-half the width of the apex in ♂, somewhat less in ♀); foveolae distinct but rather shallow, narrowly triangular. Lateral carinae little incurved but the distance between them much greater at hind than at front margin. Prozona longer than metazona. Tegmina passing hind femora, tapering toward apex; ulnar area in ♂ expanded distally, much wider than the discoidal and rather closely reticulated, the anterior ulnar vein strongly approximated to radial; in ♀ the anterior ulnar vein sub-parallel or somewhat nearer the radial, the ulnar area wider than the discoidal, but the spurious longitudinal vein less developed than in *maculipennis*. Apex of wings rarely with well-developed spurious veins. (Figs. 10, 10a). . . . . Sp. 10, *O. olivacea*.
- 5<sup>1</sup>. Antennae long, depressed, of ♂ twice, of ♀ one-and-a-half times as long as head plus pronotum. Wings abortive, or very rarely functional and in that case lacking opaque spot on costal margin. ♂ with lateral lobes of pronotum shining black and distal part of scapular area of tegmina dilated (Fig. 11); ♀ with ovipositor short, little exerted, the upper valves enlarged and strongly toothed at base (Fig. 11a). (Gen. 8, *Chloealtis*.) Sp. 11, *Ch. conspersa*.
- 4<sup>1</sup>. Foveolae visible from above as deep, linear impressions (Fig. 12). (Gen. 9, *Stenobothrus*.) . . . . Sp. 12, *St. curtipennis*.
- 3<sup>1</sup>. Tegmina with well-developed, elevated, intercalary vein (Figs. 13a, 15a). (Gen. 10, *Mecostethus*.)
9. Lateral carinae of pronotum distinctly divergent behind. Prozona shorter than metazona. Anterior distal intercalary venules (especially in ♂) oblique (Fig. 13a). Sternum 9 of ♂ not black medially.
10. Scapular area of tegmina with a conspicuous pale streak at base. Intercalary vein of ♂ with low, dull teeth (Fig. 13b). Sp. 13, *M. lineatus*.
- 10<sup>1</sup>. Tegmina without pale streak as above. Intercalary vein of ♂ with high, acute teeth (Fig. 14). . . . Sp. 14, *M. gracilis*.
- 9<sup>1</sup>. Lateral carinae of pronotum sub-parallel. Prozona and metazona of equal length. Scapular area of tegmina without pale streak. Anterior distal intercalary venules nearly transverse. Sternum 9 of ♂ black on mid-line. (Figs. 15-15b.) Sp. 15, *M. platypterus*.